CLAIMS

We claim:

1. A method for repairing defects in an article, the article comprising a substrate and an existing coating on a surface of the substrate, the article including a first plurality of cooling holes extending from the substrate and the existing coating and having a predetermined air flow requirement, the plurality of cooling holes having an outer shaped portion and an inner metering portion, the method comprising:

removing the existing coating;

recoating the surface of the article with a nonoriginal coating;

receiving an electrode having only a shaped portion with a preselected shape in the outer shaped portion of the plurality of cooling holes; and

restoring the outer shaped portion of the plurality of cooling holes to meet the predetermined air flow requirement.

2. The method of claim 2, further comprising:

propelling a stream of abrasive particles into the inner metering portion of the plurality of cooling holes to remove the repair material from the inner metering portions of the plurality of cooling holes.

3. The method of claim 1, wherein the article further includes a second plurality of cooling holes having a predetermined air flow requirement, the method further comprising:

filling the second plurality of cooling holes with a repair material prior to the recoating step; and

remanufacturing the cooling holes filled with the repair material to meet the predetermined air flow requirement using electrical discharge machining.

4. The method of claim 3 wherein the first and second plurality of cooling holes are diffusion holes.

5. The method of claim 1 wherein the existing coating is a thermal barrier coating system comprising a metallic bond coat and a ceramic thermal barrier coating on top of the bond coat.

6. The method of claim 1, wherein the substrate is an alloy selected from the group consisting of cobalt base alloys, nickel base alloys and iron base alloys.

7. The method of claim 6, wherein the alloy is a nickel or cobalt base superalloy.

8. The method of claim 1 wherein the article is a gas turbine vane.